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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,013	09/21/2001	Xiaojuen Yuan	BOE 0176 PA (PD 200164)	4213

7590 03/29/2004

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EXAMINER

ENG, GEORGE

ART UNIT	PAPER NUMBER
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2643

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/960,013

Applicant(s)

YUAN ET AL.

Examiner

George Eng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Objections

1. Claim 4 is objected to because of the following informalities: claim 4, line 11, "radio signal" should be --RF signal-- in order to unify the claimed limitation. Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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3. Claims 1, 4-5, 8 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al. (US PAT. 5,809,409 hereinafter Itoh) in view of Imai et al. (US PAT. 6,549,763 hereinafter Imai).

Regarding claim 1, Itoh discloses a balanced mixer applicable to a repeater for satellite communication systems to a reduction of unwanted wave components contained in its output wave comprising a first splitter (4, figure 1) having a first splitter input for receiving the incoming RF signal (1, figure 1) and separating the incoming RF signal into first splitter in-phase (I) signal carried by a first splitter output to a first mixer (2a, figure 1) and a first splitter quadrature (Q) signal carried by a first splitter Q output to a second mixer (2b, figure 1), wherein the first splitter Q signal is delayed 180 degrees behind the first splitter I signal, a second splitter having a second splitter input for receiving a local oscillator signal and separating the local oscillator signal into a second splitter in-phase (I) signal carried by a second splitter I output to the first mixer and a second splitter quadrature (Q) signal carried by a second splitter Q output to a second mixer, the first mixer coupled to the first splitter I output for receiving the first splitter I signal and the second splitter I output for receiving the second splitter I signal in order to generate a first mixer signal, and the second mixer coupled to the first splitter Q output for receiving the first splitter Q signal and the second splitter Q output for receiving the second splitter Q signal in order to generate a second mixer signal, and a combiner (6, figure 1) coupled to the first and second mixers and receiving the first and second mixer signals to generate an output RF signal (5, figure 1) having suppressed amount of unwanted wave (col. 14 line 32 through col. 16 line 51). Itoh differs from the claimed invention in not specifically teaching the second splitter separating the local oscillator signal into a second splitter in-phase (I) signal and a

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second splitter quadrature (Q) signal in which the second splitter Q signal is delayed 90 degrees behind the second splitter I signal. However, Imai discloses an apparatus for preventing second order harmonic interference having a splitter having an input for receiving an in-phase (I) signal and a quadrature (Q) signal from a local oscillator (18, figure 1) in which the Q signal is delayed 90 degrees behind the I signal. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Itoh in having the second splitter separating the local oscillator signal into a second splitter in-phase (I) signal and a second splitter quadrature (Q) signal in which the second splitter Q signal is delayed 90 degrees behind the second splitter I signal, as per teaching of Imai, because it prevents second order harmonic interference.

Regarding claim 4, Itoh discloses a balanced mixer applicable to a repeater for satellite communication systems to a reduction of unwanted wave components contained in its output wave comprising a first splitter (4, figure 1) having a first splitter input for receiving a local oscillator signal and separating the local oscillator signal into a first splitter in-phase (I) signal carried by a first splitter I output to the first mixer (2a figure 1) and a first splitter quadrature (Q) signal carried by a first splitter Q output to a second mixer (2b, figure 1), the first mixer coupled to the first splitter I output for receiving the first splitter I signal and the incoming RF signal in order to generate a first mixer signal, and the second mixer coupled to the first splitter Q output for receiving the first splitter Q signal and generating a second mixer signal, and a combiner (6, figure 1) coupled to the first and second mixers and receiving the first and second mixer signals to generate an output RF signal (5, figure 1) having suppressed amount of unwanted wave (col. 14 line 32 through col. 16 line 51). Itoh differs from the claimed invention in not specifically

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teaching the first splitter separating the local oscillator signal into a first splitter in-phase (I) signal and a first splitter quadrature (Q) signal in which the first splitter Q signal is delayed 90 degrees behind the first splitter I signal. However, Imai discloses an apparatus for preventing second order harmonic interference having a splitter having an input for receiving an in-phase (I) signal and a quadrature (Q) signal from a local oscillator (18, figure 1) in which the Q signal is delayed 90 degrees behind the I signal. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Itoh in having the first splitter separating the local oscillator signal into a first splitter in-phase (I) signal and a first splitter quadrature (Q) signal in which the first splitter Q signal is delayed 90 degrees behind the first splitter I signal, as per teaching of Imai, because it prevents second order harmonic interference.

Regarding claim 5, Itoh discloses a second splitter input for receiving the incoming RF signal (1, figure 1) and separating the incoming RF signal into a second splitter in-phase (I) signal carried by a second splitter output to the first mixer (2a, figure 1) and a second splitter quadrature (Q) signal carried by a second splitter Q output to the second mixer (2b, figure 1), wherein the second splitter Q signal is delayed 180 degrees behind the second splitter I signal (col. 15 lines 18-35).

Regarding 8, the limitations of the claim are rejected as the same reasons set forth in claim 1.

Regarding claim 11, the limitations of the claim are rejected as the same reasons set forth in claim 4.

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Regarding claim 12, the limitations of the claim are rejected as the same reasons set forth in claim 5.

4. Claims 2-3, 6-7, 9-10 and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Itoh et al. (US PAT. 5,809,409 hereinafter Itoh) in view of Imai et al. (US PAT. 6,549,763 hereinafter Imai) as applied in claims above, and further in view of Nazarathy et al. (US PAT. 5,424,680 hereinafter Nazarathy).

Regarding claims 2-3, Itoh discloses the balanced mixer applicable for use in radio communication systems with microwave band satellite communication systems (col. 7 lines 16-30). The combination of Itoh and Imai differs from the claimed invention in not specifically teaching the first splitter and the second splitter each comprising a microwave hybrid transformer. However, it is old and notoriously well known in the art of a splitter comprising a microwave hybrid transformer for minimizing the amount of fundamental leaking from an input port from a hybrid to an output port, for example see Nazarathy (col. 6 lines 9-14 and col. 12 lines 24-47). Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of Itoh and Imai in having the first splitter and the second splitter each comprising a microwave hybrid transformer, as per teaching of Nazarathy, in order to minimize the amount of fundamental leaking from an input port from a hybrid to an output port.

Regarding claims 6-7, 9-10 and 13-14, the limitations of the claims are rejected as the same reasons set forth in claims 2-3.

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Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sumi et al. (US PAT. 6,668,025) discloses a tuning demodulator provided with electrical and mechanical signal separating components to suppress the leaked output power from a tuning oscillation circuit (abstract). Yamaguchi et al. (US PAT. 6,628,343) discloses a television signal reception circuit capable of reducing an influence of a dispersion of each element of the semi-conductor integrated circuit (col. 3 line 56 through col. 6 line 26). Galal et al. (US PAT. 6,161,004) discloses a method for rejecting image signals in a receiver (abstract). Haartsen (US PAT. 6,081,697) discloses a compatible multi-carrier transmitter only requiring low pass filter to suppress the second harmonics (col. 2 line 20 through col.3 line 63 and col. 7 line 22 through col. 8 line 65).

6. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington D.C. 20231

Or faxed to:

(703) 872-9306 (for Technology Center 2600 only)

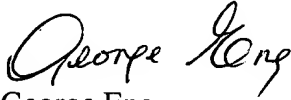
Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive,
Arlington, V.A., Sixth Floor (Receptionist).

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7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to George Eng whose telephone number is 703-308-9555. The examiner can normally be reached on Tuesday to Friday from 7:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Curtis A. Kuntz, can be reached on (703) 305-4870. The fax phone number for the organization where this application or proceeding is assigned is 703-308-6306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 306-0377.


George Eng
Primary Examiner
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